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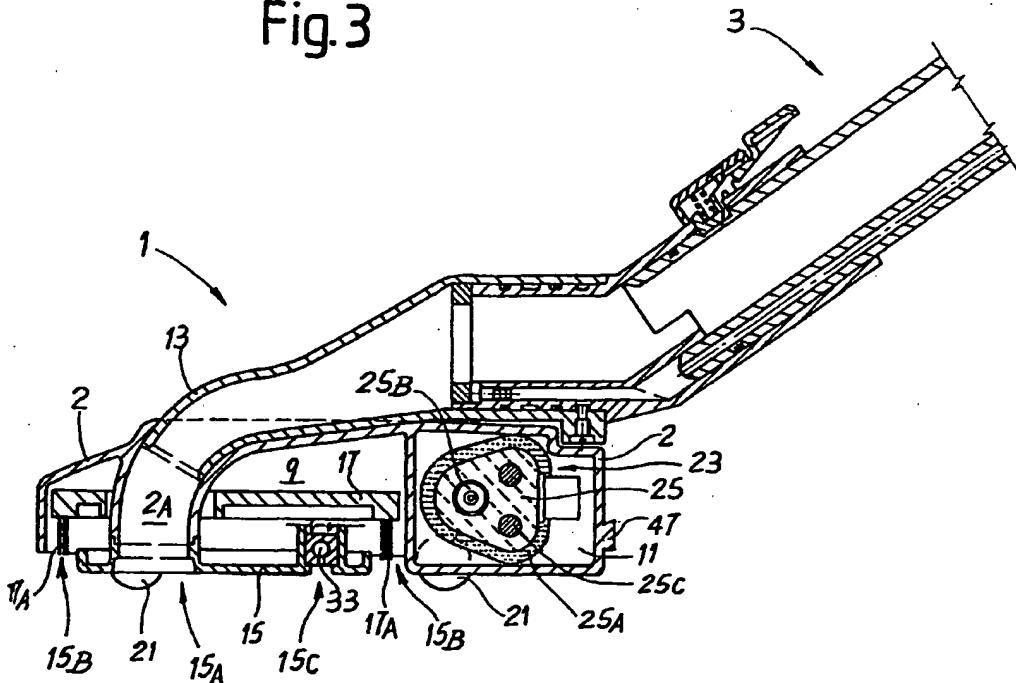
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(54) **A mop for cleaning floors and/or carpets, equipped with a suction device and a device for generating and distributing steam**

(57) The mop or broom consists of an operating head (1) furnished underneath with a suction hole (15A), at least one steam distribution hole (15C) and a retractable brush (17A). The steam generating device (23) is

housed in the operating head (1) and, via a feed pump, receives water for vaporising, the latter being contained in a tank in the body which is joined to the manoeuvring shaft (3) of the mop. A removable cloth-holding device can be applied to the head (1).

Fig. 3



Description

[0001] There already exist portable devices for cleaning floors and carpets, which, in addition to the action of a brush - sometimes motorised and rotating - also have a suction system for removing dust. These devices, which are known as electric brooms, carpet beaters etc., carry out an initial cleaning by removing the dust that has deposited, but fail to dislodge the dirt that has adhered to the surfaces in question. To this end, other devices have been invented which involve emitting steam through the operating head. This steam may be produced in a generator separate from the apparatus and connected to the head via flexible tubing, or in a body applied to the manoeuvring shaft. In these devices the steam, which for safety reasons is produced at room pressure, passing through and touching the colder feeder pipe that connects the generator to the steam distribution holes and which is extremely long, condenses for the most part and reaches the surfaces to be cleaned largely as hot water, with a reduced cleaning and disinfecting effect. Furthermore, the steam generator, which is normally a metal structure, weighs down the manoeuvring shaft of the apparatus, whereof in the said patent request, thereby tiring out the operator.

[0002] This invention refers to a mop equipped with a suction device and a device for generating and distributing steam. The mop consists of an operating head, to which a hollow manoeuvring shaft is applied; the latter has a body positioned mid-way, which encloses an aspirator equipped with a device for collecting the sucked-up water and a water-tank for feeding a steam generator, via a pump. According to the invention, said steam-generating device is housed in the operating head and receives from said tank - via a conduit - the water for vaporising. With such a lay-out, the one or more holes for distributing the steam are located practically at the point where the steam exits the generator. Therefore, without condensing, the steam arrives at 100°C on the surface to be cleaned, where it now condenses, heating the surface and turning the dirt into liquid or removing it, with excellent cleaning and sterilising effects. The water that condenses on the surface to be cleaned is therefore removed together with the dirt, by means of said suction hole. Furthermore, with said device, the steam generator does not weigh down the manoeuvring shaft of the mop unnecessarily, to the benefit of the operator.

[0003] According to the invention, a removable cloth-holder can be applied to the operating head. In this way, the apparatus can be used for steam distribution either with its own brush or with a cloth, having first stowed the brush inside the operating head in the usual way and applying the cloth-holder.

[0004] In the favoured version of the invention, the steam generator includes a body with an elongated shape made from good heat-conducting metal (for example, aluminium) and has a first cavity extending lengthwise. Said cavity is connected at one end to the

5 conduit that comes from said feeder pump for the water and, at the other end, by means of a tube several centimetres in length, to the steam distribution holes underneath the operating head. Furthermore, the generator includes at least one second cavity, located near to said

10 first cavity, designed to house an electrical heating element, electrically isolated from said metal body, and which can be brought to a temperature higher than the boiling point of water. In such a way, given the proximity and the good conductivity of the material, the walls of said first cavity will reach a more or less uniform temperature, similar to that of the heating element, in such a way that the water which passes through it will be completely vaporised in the cavity itself. At least one heat sensor is applied to the metal body in order to regulate, by means of a control circuit, the voltage of said element. Likewise, a second heat sensor is applied to the steam generator, on the basis of which, the pump for feeding water to the generator is activated only at the moment

15 in which the generator temperature has passed a pre-determined threshold, so as to avoid spreading non-vaporised water all over the floor.

[0005] Said heating element may be an electrical resistance or, preferably, a thermistor of the PTC type, for a more efficient temperature control.

[0006] In a preferable version, the cloth-holder device includes a layered rigid support, furnished on the upper part with expanders for gripping - possibly with springs - appropriate projections on the operating head, once the brush has been lifted and stowed inside and said support replaces it beneath the head. Said support has slits in correspondence with the steam suction and distribution holes in the head. Along the two parallel sides of the support there are flaps for inserting into respective pockets in a cloth when it is fastened under the head. These flaps are preferably hinged along said parallel sides of the support and pulled downwards by respective springs, to make it easier to insert the cloth and stretch it out when the mop is applied to the dirty surface.

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In this way, the mop can be used for steam-cleaning floor and carpet surfaces of the dirt which they have accumulated. The cloths can be made of absorbent disposable material, paper rather than fabric.

[0007] The design, which is not binding, shows one

45 version of the model and, in particular:

Fig. 1 shows a side view of a mop according to the invention, partially in cross-section;

Fig. 2 shows an enlarged lay-out of the operating

50 head of the mop in Fig. 1;

Figs 3 and 4 each show a side view of the operating head of the mop in Fig. 2, the head in Fig. 3 being seen in cross-section according to a vertical plane along III-III in Fig. 2;

Fig. 5 shows a perspective view of the mop head with a cloth-holder device and cloth applied;

Figs 6 and 7 each show a perspective view of a cloth-holder device and cloth to be applied to the

head in Fig. 5; and

Fig. 8 shows an enlarged view of a detail from Fig. 1.

[0008] According to the invention, the mop consists of an operating head 1 (Fig. 1) to which is joined a manoeuvring shaft 3, and a central body 5 equipped with handle, located about mid-way up the shaft 3 and joined to it.

[0009] The operating head 1 has a box-like structure 2 with a flat shape and rounded corners, which contains a forward cavity 9, open downwards, and a rear housing 11 which extends at right angles to the mop. In the central part of the forward cavity, the structure has a tubular space 2A which is arched so as to accommodate the curved end 13 of the manoeuvring shaft 3, in such a way as to permit the said shaft 3 to be inclined with respect to the head and the floor, from the extremely acute angle in Fig. 3 to the extremely wide angle in Fig. 4, according to choice.

[0010] The lower end of said tubular space 2A ends at the level of a suction hole 15A in a lower front panel 15; the panel 15 is connected to the structure 2 by means of spacers (not shown in the diagram) and defines - with its outline and the opening of the forward cavity 9 - a circular gap 15B. The cavity 9 houses a brush 17 (Fig. 3) with bristles 17A, which extends around and inside said gap 15B. The brush 17 is joined to the box-like structure in the usual way, so that, by activating a manual command 19, it assumes a raised position (as in Fig. 3) with the bristles drawn into the structure 2, or a lowered position (as in Fig. 4) with the bristles protruding from below the panel 15. The head 1 is equipped with wheels 21 to facilitate movement across the surfaces to be cleaned.

[0011] The housing 11 of the head 1 contains a steam generator 23, formed by a metal cylinder body 25, with triangular cross-section and rounded corners, said body extending at right angles to the mop and covered with a layer 25A of non-conducting material. The body 25 has a through hole 25B and two blind holes 25C, said holes having axes parallel to one another and to the rulings on the cylindrical surface of the body 25. Electrical resistances 27 are inserted and glued tightly inside the respective holes 25C, and heat sensors 28 are fixed to the body 25 for the purpose of monitoring said resistances 27 by means of a control circuit, not shown in the drawing, to keep the temperature of the body 25 at a pre-established level. The ends of the hole 25B are connected by joints, one to a tube 29 for feeding water from the central body 5 and the other to a short tube 31 connected to a distributor 33 furnished on the under side with steam distribution holes. The distributor 33 is inserted within the panel 15 at the level of the holes 15C (Fig. 3), to enable the steam to be directed onto the surface to be cleaned.

[0012] The central body 5 (Fig. 1) has a long tapering form and includes a casing 5A with a handle 5B and, at the ends of the body, seatings for, respectively, a lower

segment 3A and an upper segment 3B of the manoeuvring shaft 3. At least the lower segment 3A of the handle is hollow, in such a way as to form a conduit between the lower opening 15A (Fig. 3) of the head 1 and an upper side opening 35A (when the mop is inclined at its most acute angle) of a container 35 in which an aspirator 37, also housed in the body 5, creates a powerful decompression. The steam released from the distributor 33 onto the dirty surface is transformed into water, which

5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 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an operating head (1) with a suction hole (15A) underneath, at least one hole (15C) for distributing steam and a retractable brush (17A), the head being applied to a hollow manoeuvring shaft (3), which, at mid-height, enclosed within a body (5), has an aspirator (37), a tank (35) for collecting the water sucked up and a tank (41) for feeding water via a pump (43) and a conduit (29) to a steam generator, characterised by the fact that said steam generating device (23) is housed in the operating head (1) and that a removable cloth-holding device (53) can be applied to the head (1).

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2. Mop according to claim 1, characterised by the fact that said steam generator (23) consists of a metal body (25) with an elongated form and a through cavity (25B) along its length, said cavity being connected at one end to a conduit (29) coming from said feed pump (43) and, at the other, by means of a short tube (31), to steam distribution holes (15C) underneath the operating head (1) for spraying steam onto the surface to be cleaned, and at least one other cavity (25C) for housing an electrical heating element (27), electrically isolated from said metal body (25), with at least one heat sensor (28) being applied to the metal body in order to regulate the temperature, via a control circuit, the voltage being supplied to said element (27) in such a way that the temperature of the body (25) reaches and remains at a pre-established level.

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3. Mop according to claim 2, in which said heating element (27) is an electrical resistance.

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4. Mop according to claim 2, in which said heating element (27) is a thermistor of the PTC type.

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5. Mop as in any of the claims 1-4, characterised by the fact that said cloth-holding device (53) consists of a layered rigid support, equipped with expansion clips (49,51) for gripping - if necessary with spring catches - the appropriate projections (45,47) located on the operating head once said support is applied beneath the head, that said layered support has slot openings (53A,53B) corresponding to the steam suction and distribution holes (15A,15C) in the head (1), and that along the two parallel sides of the layered support there are flaps (55) designed for insertion into respective pockets (61) in a cloth (63) to be applied underneath the head.

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6. Mop as in claim 5, characterised by the fact that said flaps (55) are hinged along said opposing sides of the cloth-holding device (53) and that they are pulled downwards by springs (57), to facilitate the insertion of the cloth (63) and its stretching beneath the head (1).

55

Fig.1

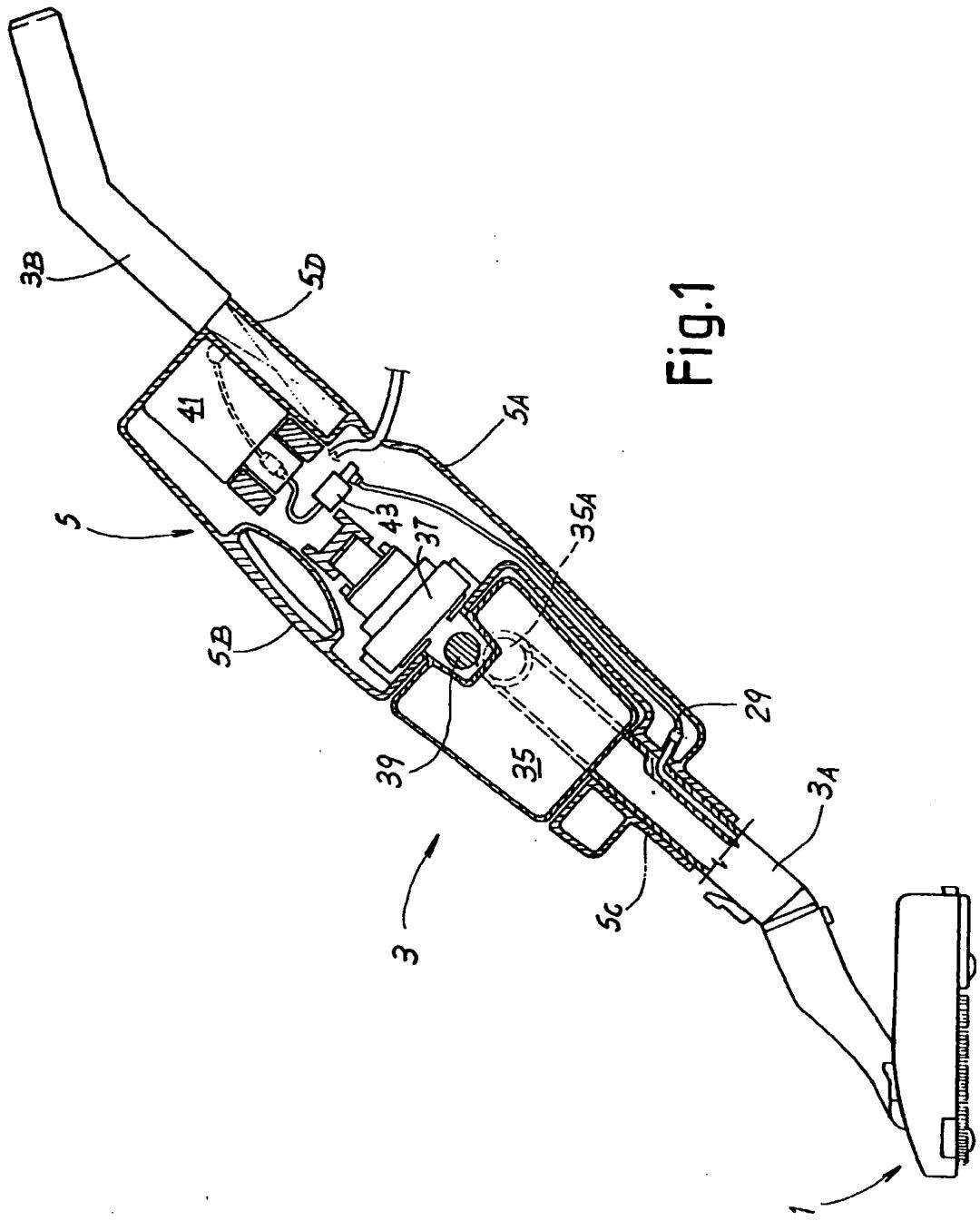


Fig.2

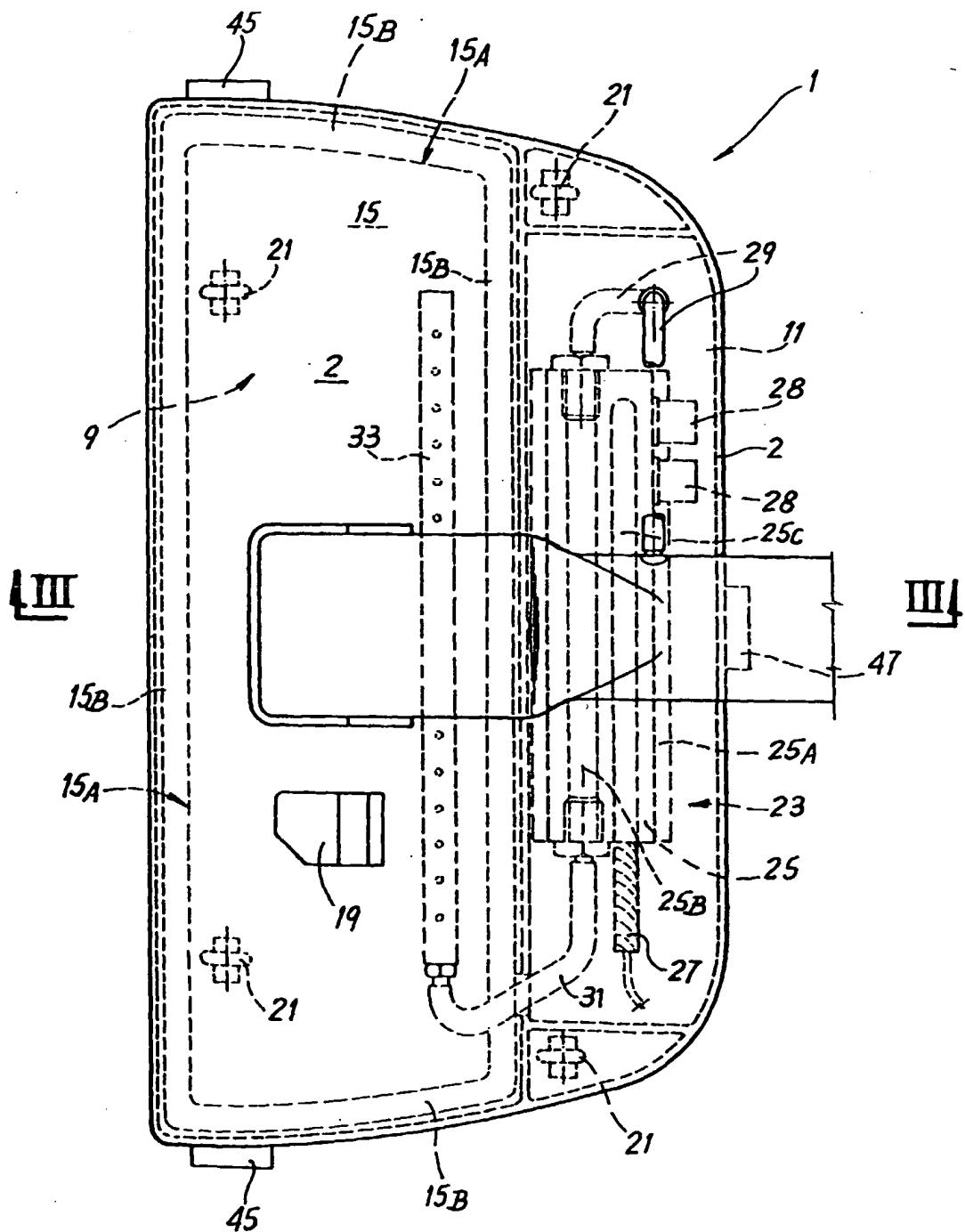


Fig.3

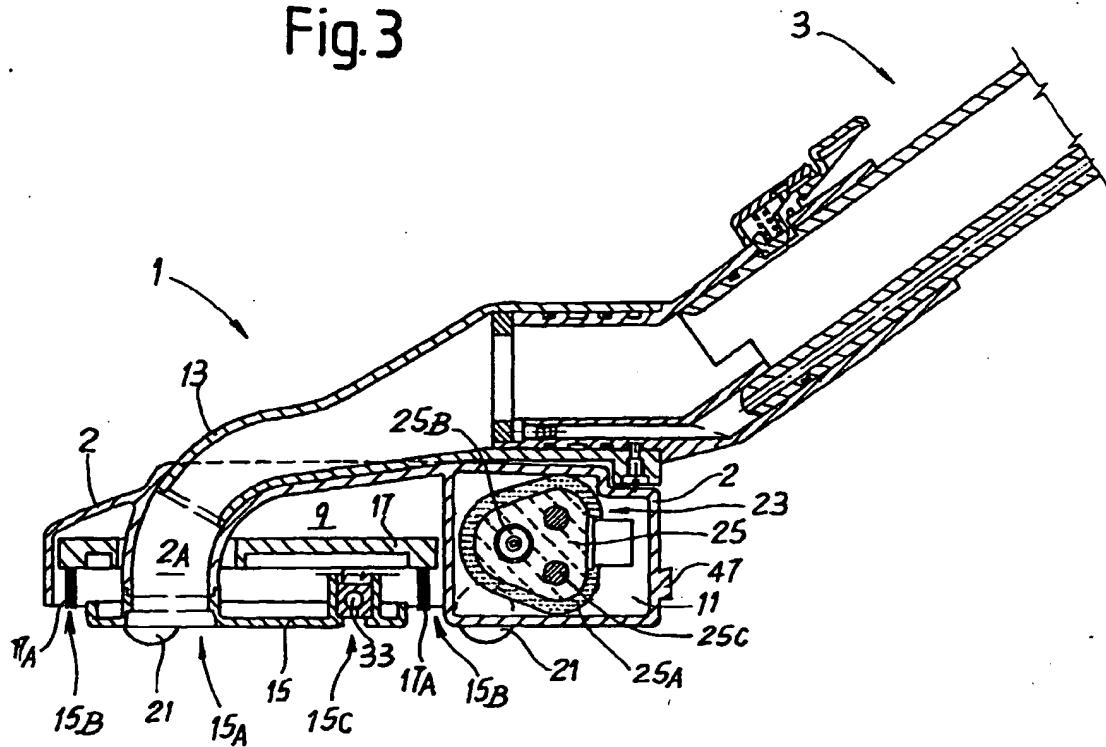


Fig.4

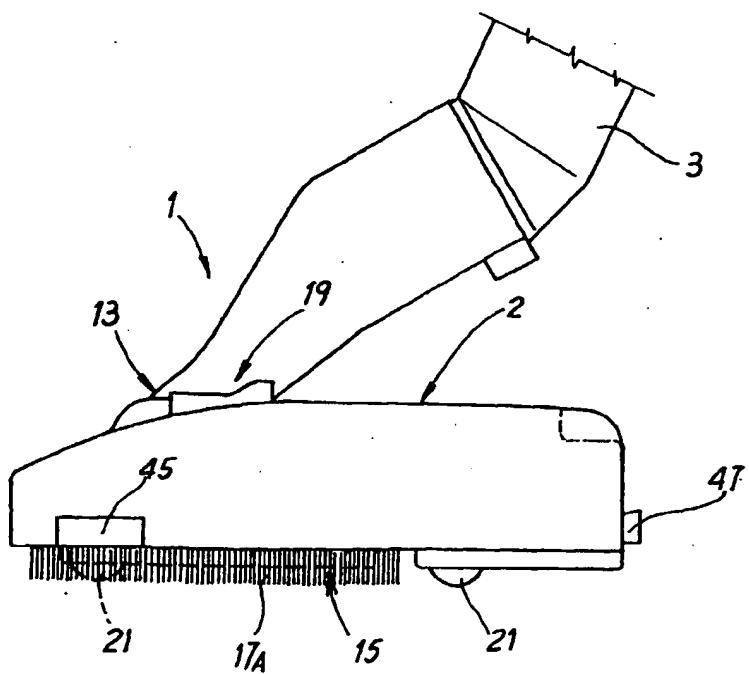


Fig.5

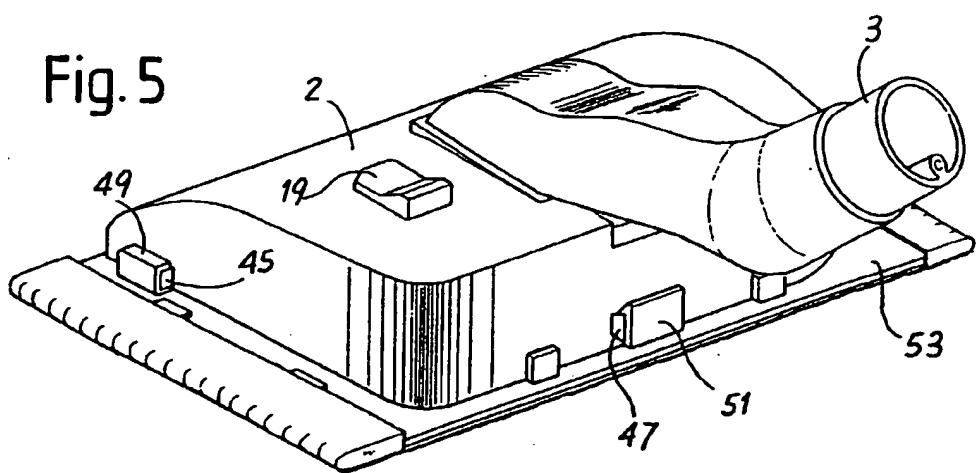


Fig.6

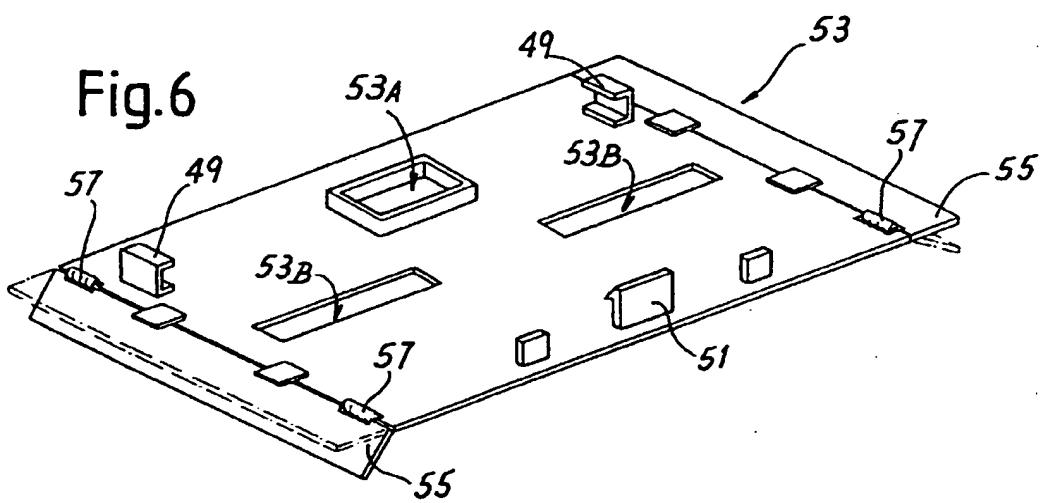


Fig.7

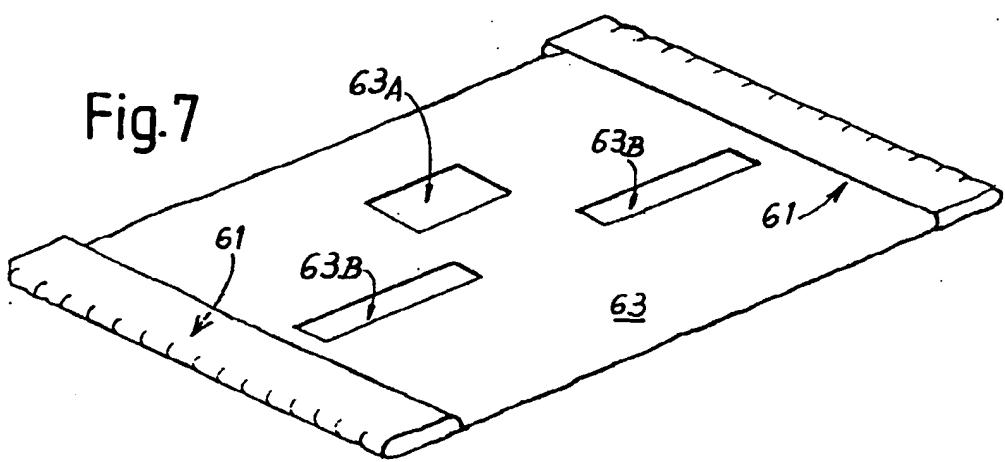


Fig. 8

